

In the Claims

The following Listing of Claims replaces all prior versions in the application:

LISTING OF CLAIMS

1. (Currently amended) An electronic circuit for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the circuit comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a first electrical signal on one of the second pair of conductors; ~~and~~

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a second electrical signal on the other of the second pair of conductors, the first and second electrical ~~signal~~signals together constituting a loop back of the differential mode signal and wherein the first steering circuit and the second steering circuit are respectively combined to generate the first electrical signal and the second electrical signal using a signal level power of the received differential mode signal; and

circuitry responsive to application of the DC voltage level and configured to disable the second steering circuit.

2. (Previously presented) An electronic circuit for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the circuit comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors;

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors; and

circuitry responsive to application of a DC voltage level and configured to disable the first steering circuit.

3. (Canceled)

4. (Previously presented) An electronic circuit for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the circuit comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors; and

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors; and

circuitry responsive to application of a DC voltage level and configured to distort the differential mode signal prior to transmitting it on the second pair of conductors.

5. (Previously presented) An electronic circuit for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the circuit comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors; and

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors, the first steering circuit and the second steering circuit are respectively combined to generate the first electrical signal and the second electrical signal using a signal level power of the received differential mode signal;

and wherein said first steering circuit includes an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

6. (Previously presented) A circuit in accordance with claim 5, wherein the second steering circuit comprises an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

7. (Previously presented) A circuit in accordance with claim 6, further comprising:
circuitry responsive to application of a DC voltage level, the circuitry configured to disable the first steering circuit.

8. (Previously presented) A circuit in accordance with claim 7, further comprising:
circuitry responsive to application of the DC voltage level and configured to disable the second steering circuit.
9. (Previously presented) A circuit in accordance with claim 6, further comprising:
circuitry responsive to application of a DC voltage level and configured to distort the differential mode signal prior to transmitting it on the second pair of conductors.
10. (Previously presented) An electronic circuit for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the circuit comprising:
a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors; and
a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors,
wherein the first steering circuit includes:
a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.
11. (Previously presented) A circuit in accordance with claim 10, wherein the second steering circuit includes:
a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.
12. (Previously presented) A circuit in accordance with claim 11, further comprising:
circuitry responsive to application of a DC voltage level and configured to disable the first steering circuit.
13. (Previously presented) A circuit in accordance with claim 12, further comprising:

circuitry responsive to application of the DC voltage level and configured to disable the second steering circuit.

14. (Previously presented) A circuit in accordance with claim 11, further comprising:
circuitry responsive to application of a DC voltage level and configured to distort the differential mode signal prior to transmitting it on the second pair of conductors.

15. (Previously presented) An electronic circuit for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the circuit comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors;

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors, the second steering circuit configured to generate the electrical signal on each of the second pair of conductors with a signal level power of the differential mode signal received on the first pair of conductors;

a current mirror associated with the first steering circuit;

a voltage storage device coupled to the current mirror; and

a switch controlled by a voltage stored on the voltage storage device, the switch coupled to the second steering circuit and configured to alter operation of the second steering circuit in response to the voltage stored on the voltage storage device.

16. (Previously presented) An electronic circuit for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the circuit comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors;

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors, the second steering circuit configured to generate the electrical signal on each of the second pair of

conductors with a signal level power of the differential mode signal received on the first pair of conductors;

a current mirror associated with the first steering circuit;

a voltage storage device coupled to the current mirror; and

a switch controlled by a voltage stored on the voltage storage device, the switch coupled to the first steering circuit and configured to alter operations of the first steering circuit in response to the voltage stored on the voltage storage device.

17. (Previously presented) A circuit in accordance with claim 15, wherein the first steering circuit includes:

an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

18. (Previously presented) A circuit in accordance with claim 16, wherein the first steering circuit includes:

an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

19. (Previously presented) A circuit in accordance with claim 17, wherein the second steering circuit comprises an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

20. (Previously presented) A circuit in accordance with claim 18, wherein the second steering circuit comprises an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

21. (Previously presented) A circuit in accordance with claim 15, wherein the first steering circuit includes:

a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.

22. (Previously presented) A circuit in accordance with claim 16, wherein the first steering circuit includes:

a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.

23. (Previously presented) A circuit in accordance with claim 21, wherein the second steering circuit includes:

a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.

24. (Previously presented) A circuit in accordance with claim 22, wherein the second steering circuit includes:

a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.

25-26. (Canceled)

27. (Currently amended) A method for controlling the loop back of a differential mode signal received at a network device on a first pair of conductors and transmitted from the network device on a second pair of conductors, the method comprising:

receiving the differential mode signal;

applying the differential mode signal to a first steering circuit and a second steering circuit;

generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;

generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit;

transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 26, further comprising:~~

receiving at the network device a power signal; and

disabling at least one of the first steering circuit and the second steering circuit in response to receipt of the power signal.

28. (Currently amended) A method for controlling the loop back of a differential mode signal received at a network device on a first pair of conductors and transmitted from the network device on a second pair of conductors, the method comprising:

receiving the differential mode signal;

applying the differential mode signal to a first steering circuit and a second steering circuit;

generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;

generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit;

transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 26, further comprising:~~

receiving at the network device a power signal; and

distorting at least one of the first signal and the second signal in response to receipt of the power signal.

29. (Currently amended) A method for controlling the loop back of a differential mode signal received at a network device on a first pair of conductors and transmitted from the network device on a second pair of conductors, the method comprising:

receiving the differential mode signal;

applying the differential mode signal to a first steering circuit and a second steering circuit;

generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;

generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit;

transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 26, further comprising:~~

mirroring current from at least one of the first steering circuit and the second steering circuit;
rectifying the mirrored current;
applying the rectified current to a voltage storage device;
using the voltage storage device to control at least one switch; and
disabling at least one of the first steering circuit and the second steering circuit with the at least one switch.

30. (Currently amended) A method for controlling the loop back of a differential mode signal received at a network device on a first pair of conductors and transmitted from the network device on a second pair of conductors, the method comprising:

receiving the differential mode signal;
applying the differential mode signal to a first steering circuit and a second steering circuit;
generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;
generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit;
transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 26, further comprising:~~

mirroring current from at least one of the first steering circuit and the second steering circuit;
rectifying the mirrored current;
applying the rectified current to a voltage storage device;
using the voltage storage device to control at least one switch; and
distorting at least one of the first signal and the second signal with the at least one switch.

31-32. (Canceled)

33. (Currently amended) An apparatus for controlling the loop back of a differential mode signal received at a network device on a first pair of conductors and transmitted from the network device on a second pair of conductors, the apparatus comprising:

means for receiving the differential mode signal;

means for applying the differential mode signal to a first steering circuit and a second steering circuit;

means for generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;

means for generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit, the first electrical signal and the second electrical signal generated using a signal level power of the received differential mode signal;

means for transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 32, further comprising:~~

means for receiving at the network device a power signal; and

means for disabling at least one of the first steering circuit and said second steering circuit in response to receipt of the power signal.

34. (Currently amended) An apparatus for controlling the loop back of a differential mode signal received at a network device on a first pair of conductors and transmitted from the network device on a second pair of conductors, the apparatus comprising:

means for receiving the differential mode signal;

means for applying the differential mode signal to a first steering circuit and a second steering circuit;

means for generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;

means for generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit, the first electrical signal and the second electrical signal generated using a signal level power of the received differential mode signal;

means for transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 32, further comprising:~~

means for receiving at the network device a power signal; and

means for distorting at least one of the first signal and the second signal in response to receipt of the power signal.

35. (Currently amended) An apparatus for controlling the loop back of a differential mode signal received at a network device on a first pair of conductors and transmitted from the network device on a second pair of conductors, the apparatus comprising:

means for receiving the differential mode signal;

means for applying the differential mode signal to a first steering circuit and a second steering circuit;

means for generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;

means for generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit, the first electrical signal and the second electrical signal generated using a signal level power of the received differential mode signal;

means for transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 32, further comprising:~~

means for mirroring current from at least one of the first steering circuit and the second steering circuit;

means for rectifying the mirrored current;

means for applying the rectified current to a voltage storage device;

means for using the voltage storage device to control at least one switch; and

means for disabling at least one of the first steering circuit and the second steering circuit with at least one switch.

36. (Currently amended) An apparatus for controlling the loop back of a differential mode signal received at a network device on a first pair of conductors and transmitted from the network device on a second pair of conductors, the apparatus comprising:

means for receiving the differential mode signal;

means for applying the differential mode signal to a first steering circuit and a second steering circuit;

means for generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;

means for generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit, the first electrical signal and the second electrical signal generated using a signal level power of the received differential mode signal;

means for transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 32, further comprising:~~

means for mirroring current from at least one of the first steering circuit and the second steering circuit;

means for rectifying the mirrored current;

means for applying the rectified current to a voltage storage device;

means for using the voltage storage device to control at least one switch; and

means for distorting at least one of the first signal and the second signal with at least one switch.

37-38. (Canceled)

39. (Currently amended) A system including a voice over IP telephone switch and at least one voice over IP telephone, the telephone including an apparatus for controlling the loop back of a differential mode signal received at the telephone on a first pair of conductors and transmitted from the telephone on a second pair of conductors, the apparatus comprising:

means for receiving the differential mode signal;

means for applying the differential mode signal to a first steering circuit and a second steering circuit;

means for generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;

means for generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit, the first electrical signal and the second electrical signal generated using a signal level power of the received differential mode signal;

means for transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 38, wherein the apparatus further comprises:~~

means for receiving at the telephone a power signal; and
means for disabling at least one of the first steering circuit and the second steering circuit
in response to receipt of the power signal.

40. (Currently amended) A system including a voice over IP telephone switch and at least one voice over IP telephone, the telephone including an apparatus for controlling the loop back of a differential mode signal received at the telephone on a first pair of conductors and transmitted from the telephone on a second pair of conductors, the apparatus comprising:

means for receiving the differential mode signal;
means for applying the differential mode signal to a first steering circuit and a second steering circuit;
means for generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;
means for generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit, the first electrical signal and the second electrical signal generated using a signal level power of the received differential mode signal;
means for transmitting the first and second signals on the second pair of conductors;
~~in accordance with claim 38, wherein the apparatus further comprises:~~
means for receiving at the telephone a power signal; and
means for distorting at least one of the first signal and the second signal in response to receipt of the power signal.

41. (Currently amended) A system including a voice over IP telephone switch and at least one voice over IP telephone, the telephone including an apparatus for controlling the loop back of a differential mode signal received at the telephone on a first pair of conductors and transmitted from the telephone on a second pair of conductors, the apparatus comprising:

means for receiving the differential mode signal;
means for applying the differential mode signal to a first steering circuit and a second steering circuit;
means for generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;

means for generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit, the first electrical signal and the second electrical signal generated using a signal level power of the received differential mode signal;

means for transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 38, wherein the apparatus further comprises:~~

means for mirroring current from at least one of the first steering circuit and the second steering circuit;

means for rectifying the mirrored current;

means for applying the rectified current to a voltage storage device;

means for using the voltage storage device to control at least one switch; and

means for disabling at least one of the first steering circuit and said second steering circuit with at least one switch.

42. (Currently amended) A system including a voice over IP telephone switch and at least one voice over IP telephone, the telephone including an apparatus for controlling the loop back of a differential mode signal received at the telephone on a first pair of conductors and transmitted from the telephone on a second pair of conductors, the apparatus comprising:

means for receiving the differential mode signal;

means for applying the differential mode signal to a first steering circuit and a second steering circuit;

means for generating a first signal to be transmitted on a first one of the second pair of conductors with the first steering circuit;

means for generating a second signal to be transmitted on a second one of the second pair of conductors with the second steering circuit, the first electrical signal and the second electrical signal generated using a signal level power of the received differential mode signal;

means for transmitting the first and second signals on the second pair of conductors;~~in accordance with claim 38, wherein the apparatus further comprises:~~

means for mirroring current from at least one of the first steering circuit and the second steering circuit;

means for rectifying the mirrored current;

means for applying the rectified current to a voltage storage device;

means for using the voltage storage device to control at least one switch; and
means for distorting at least one of the first signal and said second signal with at least one switch.

43. (Canceled)

44. (Previously presented) A system including a voice over IP telephone switch and at least one voice over IP telephone, the voice over IP telephone device for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the device comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors;

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors the second steering circuit configured to generate the electrical signal on each of the second pair of conductors with a signal level power of the differential mode signal received on the first pair of conductors; and

circuitry responsive to application of a DC voltage level disabling the first steering circuit.

45. (Previously presented) A system in accordance with claim 44, wherein the device further comprises:

circuitry responsive to application of said DC voltage level disabling the second steering circuit.

46. (Previously presented) A system including a voice over IP telephone switch and at least one voice over IP telephone, the voice over IP telephone device for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the device comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors;

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors the second steering circuit configured to generate the electrical signal on each of the second pair of conductors with a signal level power of the differential mode signal received on the first pair of conductors; and

circuitry responsive to application of a DC voltage level distorting the differential mode signal prior to transmitting it on the second pair of conductors.

47. (Previously presented) A system including a voice over IP telephone switch and at least one voice over IP telephone, the voice over IP telephone device for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the device comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors;

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors the second steering circuit configured to generate the electrical signal on each of the second pair of conductors with a signal level power of the differential mode signal received on the first pair of conductors; and

an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

48. (Previously presented) A system in accordance with claim 47 wherein the second steering circuit comprises an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

49. (Previously presented) A system in accordance with claim 48, wherein the device further comprises:

circuitry responsive to application of a DC voltage level disabling the first steering circuit.

50. (Previously presented) A system in accordance with claim 49, wherein the device further comprises:

circuitry responsive to application of the DC voltage level disabling the second steering circuit.

51. (Previously presented) A system in accordance with claim 48, wherein the device further comprises:

circuitry responsive to application of a DC voltage level distorting the differential mode signal prior to transmitting it on the second pair of conductors.

52. (Previously presented) A system including a voice over IP telephone switch and at least one voice over IP telephone, the voice over IP telephone device for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the device comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors; and

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors the second steering circuit configured to generate the electrical signal on each of the second pair of conductors with a signal level power of the differential mode signal received on the first pair of conductors;

wherein the first steering circuit includes

a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.

53. (Previously presented) A system in accordance with claim 52 wherein the second steering circuit includes

a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.

54. (Previously presented) A system in accordance with claim 53, wherein the device further comprises:

circuitry responsive to application of a DC voltage level disabling the first steering circuit.

55. (Previously presented) A system in accordance with claim 54, wherein the device further comprises:

circuitry responsive to application of the DC voltage level disabling the second steering circuit.

56. (Previously presented) A system in accordance with claim 53, wherein the device further comprises:

circuitry responsive to application of a DC voltage level distorting the differential mode signal prior to transmitting it on the second pair of conductors.

57. (Previously presented) A system including a voice over IP telephone switch and at least one voice over IP telephone, the voice over IP telephone device for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the device comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors;

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors, the second steering circuit configured to generate the electrical signal on each of the second pair of conductors with a signal level power of the differential mode signal received on the first pair of conductors;

a current mirror associated with the first steering circuit;

a voltage storage device coupled to the current mirror; and

a switch controlled by a voltage stored on the voltage storage device, the switch coupled to the second steering circuit for altering operation of the second steering circuit in response to the voltage stored on the voltage storage device.

58. (Previously presented) A system including a voice over IP telephone switch and at least one voice over IP telephone, the voice over IP telephone device for receiving a differential mode signal on a first pair of conductors and transmitting a signal on a second pair of conductors, the device comprising:

a first steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on one of the second pair of conductors;

a second steering circuit responsive to the differential mode signal on the first pair of conductors and configured to generate a signal on the other of the second pair of conductors, the second steering circuit configured to generate the electrical signal on each of the second pair of conductors with a signal level power of the differential mode signal received on the first pair of conductors;

a current mirror associated with the first steering circuit;

a voltage storage device coupled to the current mirror; and

a switch controlled by a voltage stored on the voltage storage device, the switch coupled to the first steering circuit for altering operations of the first steering circuit in response to the voltage stored on the voltage storage device.

59. (Previously presented) A system in accordance with claim 57 wherein the first steering circuit includes:

an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

60. (Previously presented) A system in accordance with claim 58 wherein the first steering circuit includes:

an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

61. (Previously presented) A system in accordance with claim 59 wherein the second steering circuit comprises an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

62. (Previously presented) A system in accordance with claim 60 wherein the second steering circuit comprises an NPN bipolar transistor and a PNP bipolar transistor having their respective emitters and collectors mutually coupled.

63. (Previously presented) A system in accordance with claim 57 wherein the first steering circuit includes:

a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.

64. (Previously presented) A system in accordance with claim 58 wherein the first steering circuit includes:

a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.

65. (Previously presented) A system in accordance with claim 63 wherein the second steering circuit includes:

a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.

66. (Previously presented) A system in accordance with claim 64 wherein the second steering circuit includes:

a P-channel MOSFET and an N-channel MOSFET having their respective drains and sources mutually coupled.